OPEN ACCESS Freely available online

ISSN: 0974-8369
Biology and Medicine

Short Communication

Interactions between the Physical and Biotic Environments

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DESCRIPTION

Ecology is the study of the interaction between an organism and its physical and biological environment. Some common ecological terms are different levels of organization within an ecosystem, the flow of energy through an ecosystem, and some biogeochemical cycles that occur in nature. The biological elements of an ecosystem are living or were previously living [1]. Biotic and abiotic components determine the adaptation of species over time and the existence of species in a particular ecosystem. Matter can change between an abiotic environment and biotic environment. For example, carbon is incorporated into plants as sugar (abiotic), but is consumed in the form of carbon dioxide (abiotic) and then released into the atmosphere. The three major ecosystem roles that organisms can play are producers, consumers, and decomposers. Producers can synthesize sugars for energy from abiotic sources by the following process called as photosynthesis of plants and algae. Energy from sunlight is absorbed and converted into chemical bonds of sugar. Chemosynthesis of deep-sea bacteria using the oxidation of inorganic compounds secreted from hydrothermal vents as an energy source. This happens when there is no light. Consumers rely on consuming organic compounds, other nutrients, and other organisms as a source of energy [2].

Herbivores, which are organisms that consume only plants, are called primary consumers. Carnivores, which are organisms that feed other animals, are known as consumers at higher levels (secondary, tertiary, quaternary, etc.). Decomposers extract energy and organic compounds from rotten dead organisms and return nutrients (mainly nitrogen and phosphorus) to producers. The food chain can be used to visualize the relationships between these three groups. However, ecosystems are more accurately represented by multiple combinations of food chains called food webs. Approximately 90% of energy is lost through each connection of the food web due to the heat of the organism and the loss of waste [3]. Therefore, producers (from a biomass perspective) tend to be more abundant than herbivores, herbivores more abundant than carnivores, etc., because each group has enough energy to sustain its population. This creates the ecological pyramid. The physical environment can cause changes in the biological environment. For example, if a natural disaster occurs in a physical environment such as a landslide, the entire biological environment at that location will be affected. Ecosystems are suffering in terms of their food supply and the relocation of local residents. Another example that emphasizes how changes in the physical environment affect the biological environment is changes in seasonal and meteorological patterns. Due to changes in the physical environment, such as rising and falling temperatures, heavy rainfall and reduced rainfall, the biological elements of the ecosystem need to adapt accordingly. For example, some animals hibernate during the winter, while humans change clothes to reflect climate change [4]. The biological environment affects the physical environment.

The biological environment can also make changes to the physical environment. For example, hills for gradual farming are gradually cut, watered and soil loosened. Such changes are brought from the biological environment to the physical environment. Species can interact with each other in different ways and affect ecosystems. Communities tend to become more complex over time. This process is known as transition, causes changes in the soil and existing organism population. Primary succession occurs when an organism gradually colonizes a bare substrate (such as a rock), develops soil, and gradually increases the number of species. Over time, as conditions change, different groups of organisms dominate. In general, the early stages of succession are characterized by rapidly growing or weed-like species that withstand extreme conditions, known as reselected species. Gradually, these early invaders are replaced by other species (selected species) that compete more effectively in a colonized and modified environment by weed colonists. Invasive species are species that are brought into new habitats and swarm with native species that share a similar niche. Invading species can have dramatic impacts on community biodiversity and energy flow [5]. The ecological consequences of interactions between two species, such as commensalism and parasitism, often differ spatially between the various abiotic and biological situations in which these interactions occur. The result of this spatial variation in ecological dynamics is that the patterns of

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Received: 28-Mar-2022, Manuscript No. BLM-22-16572; **Editor assigned:** 31-Mar-2022, Pre QC No. BLM-22-16572 (PQ); **Reviewed:** 14-Apr-2022, QC No. BLM-22-16572; **Revised:** 21-Apr-2022, Manuscript No. BLM-22-16572 (R); **Published:** 29-Apr-2022, DOI: 10.35248/0974-8369.22.14.485.

Citation: Islam A (2022) Interactions between the Physical and Biotic Environments. Biol Med. 14:485.

natural selection that species affect each other's traits differ between populations.

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